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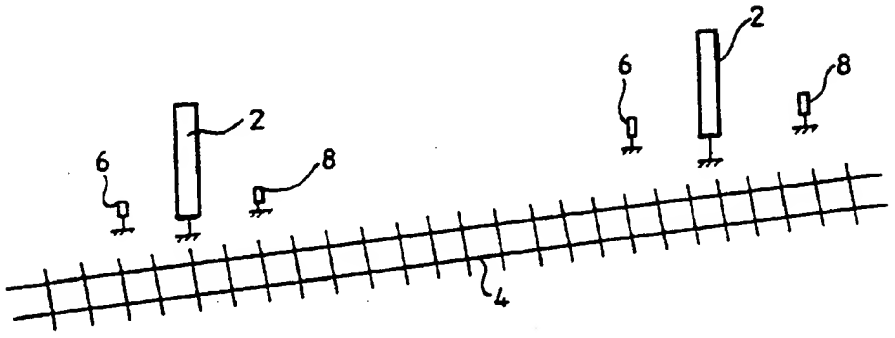
(54) **SYSTEMES D'INFORMATIONS VISUELLES**
(54) **VISUAL INFORMATION SYSTEMS**



(57) Un système d'informations visuelles comporte un réseau (2) d'éléments électroluminescents disposé sur le côté d'une voie ferrée (4). Ces éléments peuvent être individuellement alimentés en énergie par un dispositif de commande (10) en réponse à un programme préétabli enregistré dans une mémoire (12) et ils sont représentatifs d'une image visuelle préétablie. Le dispositif de commande (10) permet d'allumer ou d'éteindre des éléments sélectionnés, certains de manière répétée, suivant une séquence préétablie dictée par le programme selon un intervalle de temps de 0,015 secondes. Un capteur (6) active le dispositif de commande (10) dès qu'un train approche de telle sorte qu'un passager fixant le réseau (2) alors que le train passe, perçoit ladite image comme s'étendant apparemment sur une aire sensiblement plus grande que l'aire dudit réseau (2).

(57) A visual information system includes an array (2) of light emitting elements located at the side of a train track (4). The elements are individually energisable by a controller (10) in response to a predetermined program stored in a memory (12) and representative of a predetermined visual image. The controller (10) causes selected elements to be turned ON and OFF, some repetitively, in a predetermined sequence as dictated by the program with a time span of 0.015 seconds. A sensor (6) activates the controller (10) upon the approach of a train so that a passenger gazing at the array (2) as the train passes will perceive the said image apparently extending over an area substantially greater than the area of said array (2).

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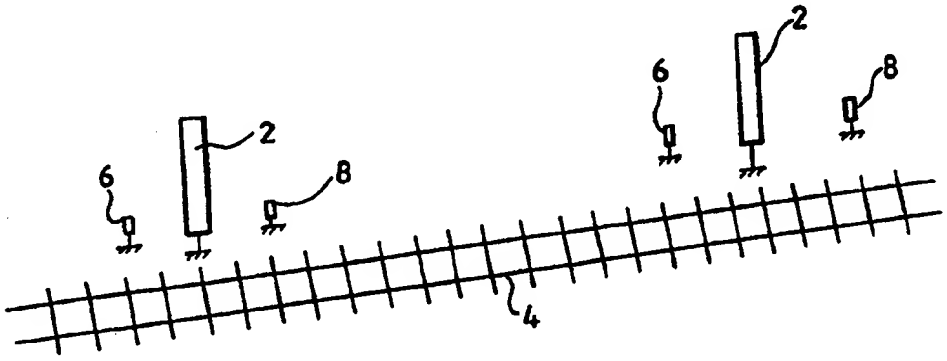

(57) Abstract

A visual information system includes an array (2) of light emitting elements located at the side of a train track (4). The elements are individually energisable by a controller (10) in response to a predetermined program stored in a memory (12) and representative of a predetermined visual image. The controller (10) causes selected elements to be turned ON and OFF, some repetitively, in a predetermined sequence as dictated by the program with a time span of 0.015 seconds. A sensor (6) activates the controller (10) upon the approach of a train so that a passenger gazing at the array (2) as the train passes will perceive the said image apparently extending over an area substantially greater than the area of said array (2).

VISUAL INFORMATION SYSTEMS

The present invention relates to visual information systems.

Advertising is often presented in illuminated form consisting of an array of fluorescent lights. Such lights are usually switched on during the hours of darkness. The array occupies the same area as the image presented and consumes relatively large amounts of energy. Such systems are relatively inflexible in as much as the whole array needs to be rebuilt to display another image.

Other arrays of moving images are known in which an array consisting of a plurality of rows and columns of light sources are individually energisable to produce, for example, a moving message. Such arrays have several times more columns of light source than rows. Also, the size of the array is the same size as the image and consequently the wiring of individual light sources to the controlling circuitry and the complexity of the control circuitry are likely to be very costly.

It is an object of the invention to provide an improved visual information system.

According to the present invention there is provided a visual information system comprising an array consisting of a plurality of individually and selectively energisable light sources arranged in rows and columns, a memory for storing a program representative of a predetermined image, a controller actuatable to control the selection and sequence of energisation of the light sources within a predetermined time span in accordance with the predetermined program stored on the memory so that a viewer observing the array and being carried past the array at a predetermined speed will observe immediately following said predetermined time span the said predetermined image as an apparently stationary image occupying an area substantially larger than the area of

said array.

According to the present invention there is further provided a visual information display system comprising a fibre optic array in which one end of a bundle of optical fibres is arranged so that the ends of the individual fibres at one end of the bundle form a vertically elongate array of rows and columns and the ends of the individual fibres at the opposite end of the bundle are connected to an elctro-optical interface unit, and means for supplying electrical signals to the interface unit to cause the array to display a succession of images in sufficiently quick succession that a viewer being carried past the array perceives a single horizontally elongate display consisting of said successive images located side by side.

Visual information system embodying the invention will now be described, with reference to the accompanying diagrammatic drawings, in which:

Figure 1 is a front elevation of the system;

Figure 2 is a block diagram of the system;

Figure 3 is a more detailed block diagram of the system;

Figure 4 is a block diagram of another form of system embodying the invention; and

Figure 5 is an end view of a train passing through a tunnel and illustrating the positioning of the system.

The visual information system to be described is arranged to be located in tunnels through which public transportation vehicles such as tube trains normally run. The system consists of a series of light source arrays 2 arranged at spaced intervals along the track 4 on the side wall of the tunnel, generally level with the windows of the train so that the arrays can be viewed by the passengers in the train. A sensor 6 located upstream of

each array 2 is responsive to the approach of the train to the array to actuate the array. Another sensor 8 located downstream of each array is responsive to when the train has passed to deactivate the array 2. The sensors 6 and 8 may take the form of infrared transmitter and receiver pairs.

Each array 2 consists of four columns and sixty four rows of individually and selectively energisable light sources for example light emitting diodes.

Selected light sources in the array are switched ON and OFF by a controller 10 in accordance with a predetermined program stored in a memory 12. The controller is triggered by the sensor 6 and the program is cyclically repeated until a signal is received from the sensor 8.

The switching rate of the light sources and the duration of their energisation is such that a passenger sitting in the train and keeping his eyes directed at the array will observe an image several times wider than the width of the array.

The effect is achieved because with light flashes of very short duration, the reaction of the human eye to the flash persists long after the flash has finished. Thus, where a series of very short flashes occur over a short time span less than 0.015 seconds, all the flashes appear to the eye to have occurred at the same time and when the flashes are spaced from one another on the retina because the viewer has moved relative to the array, the eye perceives a composite light pattern which will persist for a short while immediately following the time span. It will thus be appreciated that a program can be created and stored in the memory 12 which will produce almost any desired image for the observer. The image may take the form of alpha numeric information or my take the form of an advertising poster.

The block diagram of the system is more clearly shown in Figure 3.

As can be seen, the array 2 consists of a series of light emitting diodes 20. In this arrangement only sixteen are shown, arranged in a single column. Each LED has a power output of 32 mcd's and has a high switching speed with a switching time faster than 10 nanoseconds.

The controller 10 includes a driver 22 which acts to drive the LED's 20 through respective resistors 24. The driver 22 is controlled by a central processing unit (CPU) 26 which derives its instructions from terminal 1 of the memory 12 via resistors R36 and R34 which feed terminal 5 of the CPU. The memory 12 is in the form of an erasable programmable read only memory (EPROM).

The CPU 26 is triggered into action by a signal received on terminal 28 from the sensor 6.

The CPU cyclically repeats the program stored in the EPROM 12 at a repetition rate in the range of from 10-50 Hz but is preferably 15 Hz.

By updating the memory periodically the passengers will be able to observe different images.

When a large plurality of arrays are provided they can be divided into groups with the memory of the system in each group being updatable simultaneously. A central computer (not shown) is provided to store a plurality of different programs. The central computer is connected to each group to update the memory in each group with a new program depending either upon the time of day or the location of the group.

When a colour image is required, each light source of the array can be replaced by a row consisting of red, green and blue elements or a row consisting of red, green, blue and white light elements. Each element is selectively energisable. It will be appreciated that by having the program determine, the period of energisation

of each light source, the shade of colour in the final image can be varied as required.

While the rows and columns in each memory can be varied, it is preferable that the ratio of rows to columns in the array is 16:1 or greater.

In the embodiment shown in Figure 4, the optical array 20 consists of an array formed by the exposed ends of a bundle 22 of optical fibres. The opposite ends of the elctro-optical fibres of the bundle 22 are connected to an electro-optical interface unit 24. Data representative of a desired image to be displayed is transmitted from a central computer 32 by radio optical or direct wire link to a data interface unit 30 which passes the signals to a processor 28 which in turn causes the signals to be stored in a storage unit 26. The processor 28 is responsive to a local trigger such as the sensors 6 and 8 described in connection with Figures 1 and 2 or a remote trigger, to cause the elctro-optical interface to read out the stored data from the memory 26 and to cause the corresponding image to be progressively reproduced on the display 20 in a manner such as that described in conjunction with Figures 1 to 3.

The central computer 32 can be programmed to send different displays to different groups of optical arrays as required and alter the displays stored by the memories 26 at different times of the day, week and/or month.

In the embodiment show in Figure 5, a train 36 within a tunnel 34 carries an on-board transmitter 38 which is connected to an on-board or a remote central computer 32. Data from the computer 32 is transmitted by the transmitter 38 to a receiver 40 adjacent a display 20 mounted on the wall of the tunnel. The receiver is connected to the data interface 30 (see Figure 4) of the display from whereon the system operates in the same

manner as described in connection with Figure 4.

The transmitter and receiver may be acoustic, optical or radio. Also, the train may have an on-board speed monitor and data representative of the speed of the train transmitted to the processor 28 so that the processor can modify the rate that the electro-optical interface reads signals from the memory 26 in a manner to synchronise the display with the speed of the train.

In a modification, instead of the interface 24 reading signals from the memory 26, the memory 26 can be omitted and the signals read in real time from the processor 28.

CLAIMS

1. A visual information system for use in connection with a carrier for carrying observers along a predetermined path, the system comprising an array to be located adjacent said path and consisting of a plurality of individually and selectively energisable light sources arranged in rows and columns, a memory for storing a program representative of a predetermined image, a controller actuatable to control the selection and sequence of energisation of the light sources within a predetermined time span corresponding to the persistence time of the human retina to light, and in accordance with the predetermined program stored in the memory, the rate of operation of the controller being set to correspond with the speed of the carrier past the array whereby an observer carried by the carrier past the array will observe said predetermined image as an apparently stationary image occupying an area substantially larger than the area of said array.

2. A system according to Claim 1, including sensing means for monitoring the passage of a carrier carrying said viewer past the array to actuate said controller.

3. A system according to Claim 2, wherein said sensing means comprises infrared sensing means arranged to activate said controller upon the approach of said carrier to the array and to deactivate the controller upon the departure of said carrier away from said array.

4. A system according to Claim 3, wherein the sensing means comprises a first infrared transmitter and receiver pair located upstream of the array and a second infrared receiver and transmitter pair located downstream of the array.

5. A system according to any preceding claim, wherein the controller is arranged to cyclically repeat the energisations specified by the predetermined program

at regular intervals.

6. A system according any preceding claim, wherein the array consists of light sources of different colours and wherein the predetermined program specifies different durations of energisation of the different coloured light sources.

7. A system according any preceding claim, wherein said controller is arranged to complete one cycle of the predetermined program within a period of 0.015 seconds.

8. A system according to any preceding claim, wherein the ratio of rows to columns in the array is 16:1 or greater.

9. A system according to Claim 1, wherein each light source comprises a light emitting diode and the controller includes a driver for driving each light emitting diode, the driver being arranged to vary the period for which its corresponding diode is energised in accordance with the program stored in the memory.

10. An arrangement comprising a plurality of systems each according to any preceding claim and a main computer arranged to store a plurality of different programs each representing a respective image, said main computer being operable to replace the program stored in said memories with a program stored in said main computer.

11. An arrangement according to Claim 10, wherein said main computer is programmed to replace the program stored in selected ones of the memories in accordance with the time of day.

12. An arrangement according to Claim 10 or Claim 11, wherein the computer is programmed to replace the program stored in selected ones of the memories in accordance with the location of their associated arrays.

13. In a transport system, a path along which carriers can pass and a visual display system located adjacent said path, the display system comprises a fibre

optic array in which one end of a bundle of optical fibres is arranged so that the ends of the individual fibres at one end of the bundle form a vertically elongate array of rows and columns and the ends of the individual fibres at the opposite end of the bundle are connected to an electro-optical interface unit, control means for supplying electrical signals to the interface unit to cause the array to display a succession of images and means for controlling the rate at which the control means supplies said signals in accordance with the speed of the carrier past the system, and within a time frame related to the persistence time of the human retina to light, whereby an observer on the carrier will perceive apparently simultaneously a single horizontally elongate display consisting of said successive images located side by side.

14. A system according to Claim 13, wherein the control means includes a remote computer for generating data representative of a desired display, a local data interface for receiving the data, and a processor for processing the received data and storing it in a memory, the processor being arranged to control the interface unit to respond to the data stored in the memory.

15. A display system according to Claim 14, wherein the carrier is a train, the path is defined by a train tunnel, and the array is mounted on the wall of the train tunnel and further comprising an on-board transmitter on a passing train to transmit data to the computer to supply the interface unit with said data.

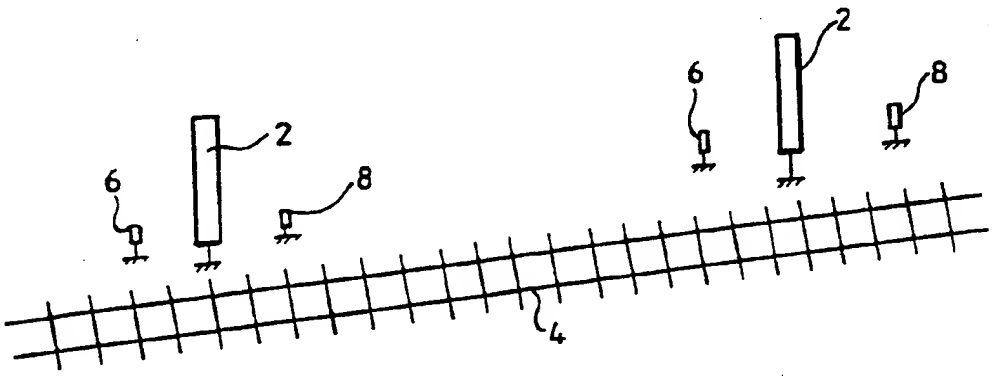

Fig.1.

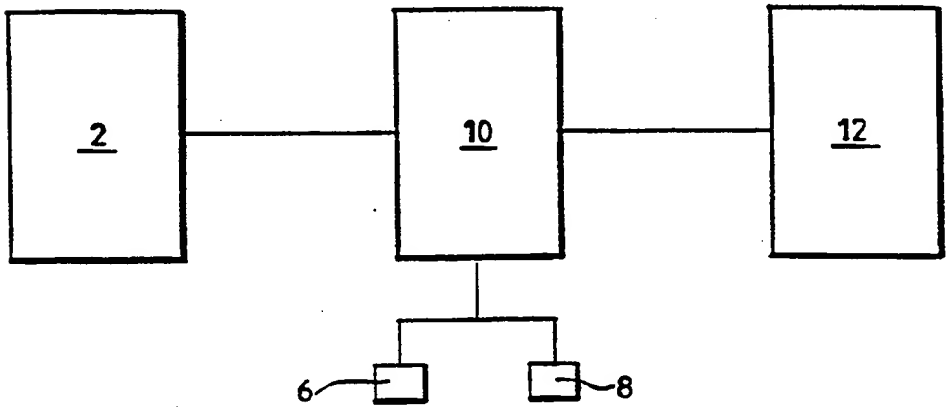

Fig.2.

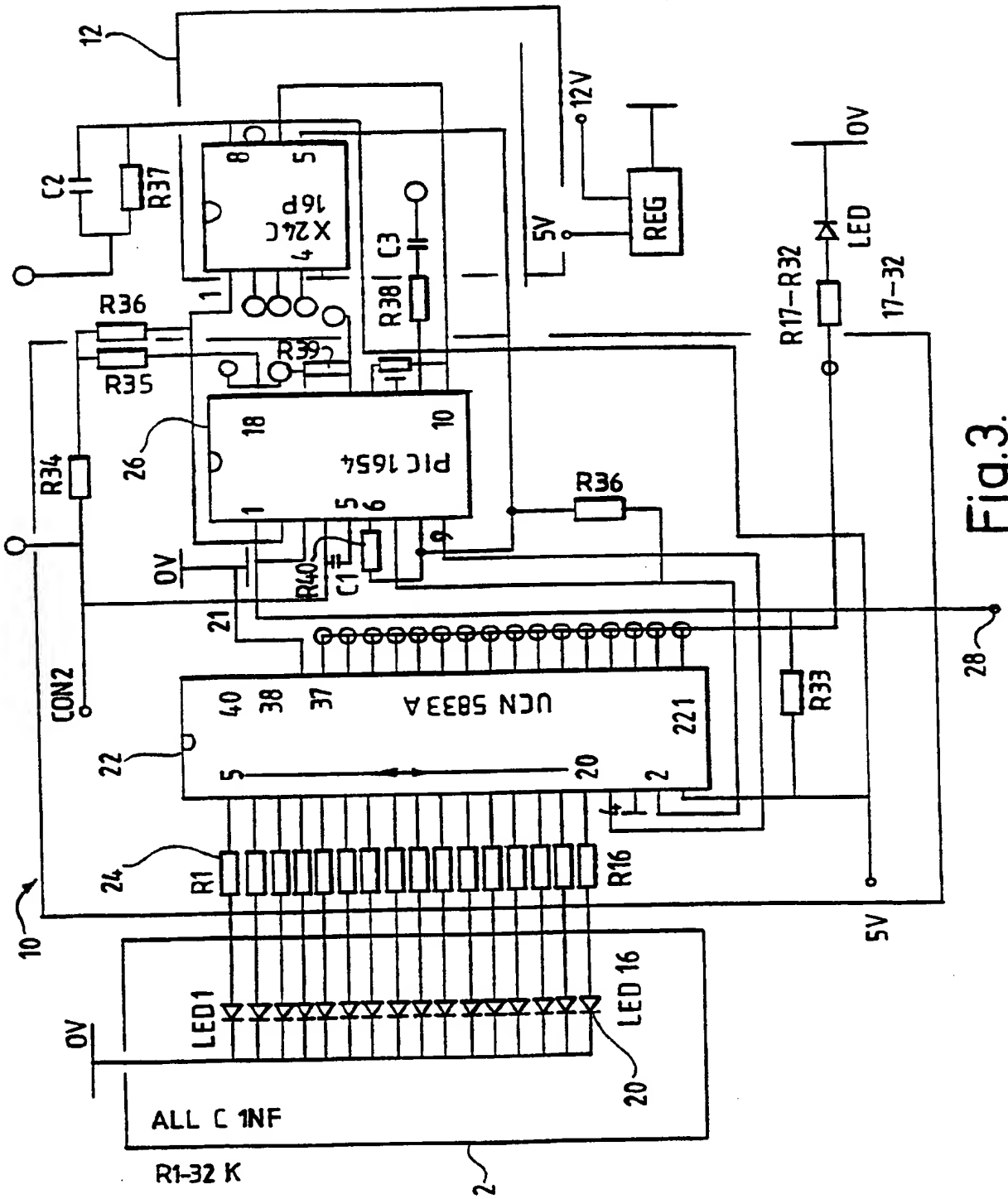
12
12V
0V
C2
R37
X2¼C
16P
C3
5V
REG
LED
R17–R32
17–32
R36
R38
R39
R35
PIC 16S4
18
10
26
R34
R36
1
5
6
9
0V
R40
C1
21
28
CON2
UCN 5833A
40
38
37
221
R33
22
5
20
2
4
1
24
R1
R16
10
5V
LED1
LED 16
0V
20
ALL C 1NF
R1-32 K
2

Fig.3.

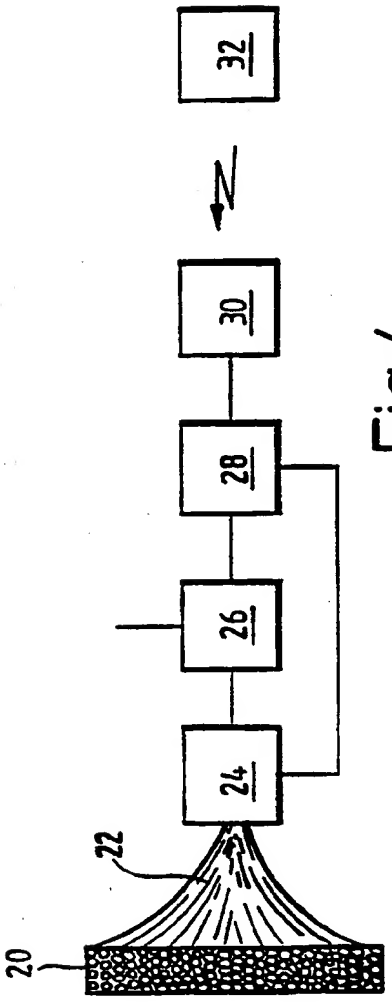

Fig.4.

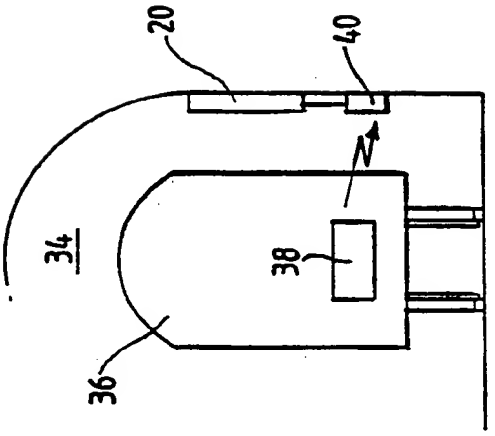

Fig.5.